



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

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June 29, 2015

Mr. Bob A. Castaldo
Director, Environmental Health & Safety
Massachusetts General Hospital
West End House, B-19
16 Blossom Street
Boston, MA 02114

RE: **CHARLESTOWN** – Metropolitan
Boston/Northeast Region
310 CMR 7.02 Plan Approval
Application No. MBR-02-COM-001
MODIFIED PLAN APPROVAL
FMF No. 257875, RO No. 257876

Dear Mr. Castaldo:

The Metropolitan Boston/Northeast Region of the Department of Environmental Protection, Bureau of Air and Waste, has completed its technical review of your modification to your Plan Approval listed above. Woodard & Curran submitted this Plan Application on behalf of Massachusetts General Hospital (“MGH”) to modify its Non-major Comprehensive Plan Approval number MBR-02-COM-001, dated May 8, 2002 for the Caterpillar Model 3512TA cogeneration engine located at Lawrence E. Martin Labs, 149 Thirteenth Street, Charlestown, Massachusetts. This Plan Application was submitted as a result of an Administrative Consent Order and Penalty (ACOP-NE-15-9003-27) between the MassDEP and Massachusetts General Hospital to address the non-compliance issues associated with MGH’s failure to install a permitted parametric emissions monitoring system for oxides of nitrogen (NOx) and carbon monoxide (CO).

MGH proposes to install a continuous emissions monitoring system (CEMS) and operate it in accordance with the quality assurance/quality control (QA/QC) plan (submitted on April 29, 2015) to monitor the emissions of NOx and CO from the cogeneration engine.

The Department has determined that your application is administratively and technically complete and that the proposed equipment is in conformance with current air pollution control engineering practices. Therefore, the Department hereby grants **Modified Plan Approval** for the proposed continuous emissions monitoring system (CEMS) QA/QC plan.

Please review the entire Approval carefully, as it stipulates the particular conditions with which the facility owner/operator must comply in order for the facility to be operated in compliance with the Regulations. Failure to comply with this Approval will constitute a violation of the Regulations and can result in the revocation of the Approval.

A. EQUIPMENT DESCRIPTION

Table I below contains a description of the existing combustion Unit No. 1 at the MGH, Lawrence E. Martin Labs, 149 Thirteenth Street, Charlestown facility.

Table I. Equipment Description

Unit ID	Units Description	Fuel used	Maximum heat input rating (Btu/hr)*
1	Caterpillar Gas Engine, Model G3512TA	Natural Gas	6,724,360

*Btu/hr = British thermal units per hour

The engine/generator set (Unit No. 1) is capable of producing 570 kilowatts at maximum output and 125,000 pounds of hot water per hour. The subject unit has a maximum energy input capacity of 6,724,360 Btu per hour and a maximum fuel consumption rate of 6,724 cubic feet per hour of natural gas as its only fuel of use.

The subject stoichiometric (rich burn) engine is equipped with a Non-Selective Catalytic Reduction (NSCR) system for control of nitrogen oxides (NO_x), carbon monoxide (CO), and non-methane hydrocarbons as volatile organic compounds (VOC) emissions. The exhaust gases from the subject engine, at a maximum temperature of 892 degrees Fahrenheit pass through a DCL Model 2-DC-74.5-250 catalytic converter, NSCR system or equivalent which will achieve minimum NO_x, CO and VOC control efficiencies of 98.0 percent, 97.5 percent and 30 percent, respectively. The catalyst's operating temperature range is from 750 to 1250 degrees Fahrenheit and its maximum pressure drop is 4 inches.

The exhaust gases exiting Unit No. 1 are emitted through a dedicated 12 inch diameter, vertical, steel stack. The height of the stack exit is 22 feet above the building roof and 142 feet above ground level. The maximum stack gas exit velocity from the stack is 68 feet per second at 350 degrees Fahrenheit. The exhaust gases exit vertically, and shall not be impeded by any rain protection device (See Condition No. 5 below).

B. EMISSION LIMITATIONS

Table II below contains the maximum emission rates of NO_x, CO, VOC, sulfur dioxide (SO₂), and particulate matter (PM) from the subject engine, after controls, in grams per brakehorsepower-hour, pounds per hour, and in tons per rolling 12-month period. To add, the NO_x and CO are given in parts per million referenced to 0.3 percent oxygen (ppm@0.3% O₂).

Table II. Emission Limitations - Unit No. 1

Pollutant	Grams per brake horsepower-hour	Parts per million @0.3% O₂	Pounds per hour	Allowable Emissions Tons per Rolling 12 Month Period
NOx	0.20	49	0.35	1.53
CO	0.30	121	0.53	2.32
VOC	0.32	NA	0.56	2.44
PM	0.05	NA	0.09	0.39
SO2	0.002	NA	0.004	0.02

NA = not applicable

Parts per million is referenced to 0.3 percent oxygen.

C. CONTINUOUS EMISSIONS MONITORING SYSTEM

MGH proposes to install, operate and maintain a CEMS that includes a Teledyne-API Model T300M CO analyzer or equivalent and a Teledyne-API Model T200M NOx analyzer or equivalent to measure CO and NOx concentrations, respectively. The CEMS data acquisition system (DAS) monitors, retrieves, and records the environmental data from the NOx and CO analyzers. The data logger monitors the inputs every second while the NOx and CO values are averaged for one minute intervals along with 15-minute and one-hour intervals. The one- hour averages for NOx and CO in units of ppm@0.3% O₂ are used to determine compliance with this plan approval.

MGH submitted a CEMS quality assurance/quality control (QA/QC) Plan, dated April 29, 2015, which has been developed for the operation of the CEMS servicing the cogeneration engine.

D. CONDITIONS

1. This Modified Plan Approval shall supersede in its entirety the plan approval issued on May 8, 2002 for MBR-02-COM-001,.
2. MGH shall notify this Office, in writing, attention Permit Chief, Bureau of Air and Waste, when the installation of the proposed CEMS is complete and it is deemed ready for operation, within 14 days thereof.
3. Should any nuisance condition(s) be generated by the operation of the above-described equipment, then appropriate steps shall immediately be taken by MGH to

abate said nuisance condition(s).

4. A copy of this Approval letter shall be affixed at or adjacent to the subject equipment. The Standard Operating and Maintenance Procedures for the subject engine/air pollution control equipment shall be kept and maintained in the Facilities Office.
5. Any stack exit rain protection device shall not impede the exhaust gas flow from Unit No. 1's exhaust stack.
6. The emission rates for the subject Unit No. 1 shall not exceed the emission limitations contained in Table II above at any firing rate except during periods of startup and shutdown.
7. The 25% Facility Emission Cap Final Approval Emission Restrictions letter dated March 5, 1998 shall remain in full force and effect for the facility-wide emissions from this facility.
8. Natural gas shall be the only fuel of use in Unit No. 1. Unit No. 1 shall be equipped with a fuel meter and recorder, which cannot be reset.
9. For compliance testing purposes, Unit No. 1 shall be constructed so as to accommodate the emissions testing requirements as stipulated in 40 CFR Part 60, Appendix A. The two outlet sampling ports (90 degrees apart from each other) for Unit No. 1 must be located at a minimum of one duct diameter upstream and two duct diameters downstream of any flow disturbance.
10. MGH shall continuously monitor the air emissions for NO_x, CO and O₂ as a diluent gas by installing, calibrating, maintaining and operating a CEMS to determine the hourly NO_x and CO emissions in units of [ppm@0.3%](#) O₂ rate in pounds per hour (lb/hr).
11. MGH shall use and maintain its CEMS as "direct-compliance" monitors to measure NO_x, CO and oxygen. "Direct-compliance" monitors generate data that legally documents the compliance status of Unit No. 1. MassDEP will utilize the data generated by the "direct-compliance" monitors for compliance and enforcement purposes.
12. MGH shall operate the CEMS serving Unit No. 1 at all times, including startup and shutdown periods, except for periods of CEMS calibration checks, zero and span adjustments, preventative maintenance and period of unavoidable malfunction.
13. MGH shall maintain an adequate supply of spare parts on-site to maintain the air pollution control system and CEMS equipment servicing the proposed project.

14. MGH shall install, calibrate, test and operate a CEMS and associated Data Acquisition and Handling System(s) (DAHS) and to measure and record the following emissions from the subject project:
 - a) Oxygen (O₂)
 - b) Oxides of Nitrogen (NO_x)
 - c) Carbon Monoxide (CO)
15. MGH shall compile the startup and shutdown emissions data records (from the CEMS) for NO_x and CO to be used to determine the startup and shutdown limits for Unit No. 1. Emission data generated from this compilation shall be made available for review by MassDEP prior to determining and approving the maximum allowable emissions for these periods of time.
16. All periods of excess emissions from the subject engine, even if attributable to an emergency/malfunction or start up/shutdown, shall be quantified and included by MGH in the determination of compliance with the emission limitations as stated in Table II and Table III above.
17. Any subsequent changes to the CEMS quality assurance/quality control (QA/QC) Plan shall be approved by the Department.
18. If and when MassDEP requires it, MGH shall conduct emission testing in accordance with USEPA Reference Test Methods and Regulation 310 CMR 7.13.
19. MGH shall submit the Final Standard Operating and Maintenance Procedures (SOMP) concerning the subject engine/air pollution control system to this Office, attention Permit Chief, Bureau of Air and Waste, within 60 days of continuous operation of the unit. The Final SOMP must include standard operating and maintenance procedures for the subject engine and the air pollution control system.
20. MGH shall submit any subsequent revision(s) made to the Final SOMP concerning Unit No. 1, to this Office, attention Permit Chief, Bureau of Air and Waste, within 15 days of said revision(s). MGH shall operate the subject engine consistent with the Final SOMP.
21. MGH shall maintain adequate records on-site to demonstrate compliance with the emission limitations contained in Table II above. At a minimum, the information shall include the actual emissions of NO_x, CO, VOC, SO₂ and PM for the month as well as the prior 11 months, as well as adequate records to document facility-wide emissions. Said records shall be made available to Department personnel upon request, and shall be kept on-site for a minimum of five (5) years. (See attached On-Site Record Keeping Form for an example of a format that is acceptable to the Department. An electronic version of this form in Microsoft Excel format can be downloaded at <http://www.state.ma.us/dep/nero/bwp/nerobwp.htm>).

22. MGH shall submit an annual report to this Office by March 15 of each year containing its actual emission rates, for Unit 1 and facility-wide, for the previous calendar year, both monthly and running 12 month totals, for the following air contaminants: NO_x, CO, PM, and SO₂. (See attached Annual Report Form for an example of a format, which is acceptable to the Department. An electronic version of this form in Microsoft Excel format can be downloaded at ("<http://www.state.ma.us/dep/nero/bwp/nerobwp.htm>").
23. MGH shall keep monthly records of maintenance activities for the subject engine/generator set and air pollution control system. These records shall be maintained on-site for a minimum of five years and shall be made available to Department personnel upon request.
24. Should asbestos remediation/removal be required as a result of the approved construction, reconstruction, or alteration of this facility, removal/remediation of asbestos shall be done in accordance with Regulation 310 CMR 7.15 in its entirety and 310 CMR 4.00.
25. Please be advised that this Approval does not negate the responsibility of MGH to comply with this or any other applicable federal, state, or local regulations now or in the future. Nor does this Approval imply compliance with this or any other applicable federal, state, or local regulations now or in the future.
26. MGH shall allow Department personnel access to the subject facility site, buildings, and all pertinent records at all times for the purpose of making inspections and surveys, collecting samples, obtaining data, and reviewing records.
27. This Approval may be suspended, modified, or revoked by the Department if, at any time, the Department determines that MGH is violating any condition or part of this Approval.
28. MGH shall notify the Northeast Regional Bureau of Air and Waste office, attention Permit Chief, by email at NERO.Air@massmail.state.ma.us or FAX at (978) 694-3499, as soon as possible, but no later than three (3) business day after discovery of an exceedance(s) of Tables II and III requirements. A written report shall be submitted to Permit Chief at MassDEP within ten (10) days thereafter and shall include: identification of exceedance(s), duration of exceedance(s), reason for the exceedance(s), corrective actions taken, and action plan to prevent future exceedance(s).
29. This Modified Plan Approval consists of the application materials for the original application submittal and this modification, and this Approval letter. If conflicting information is found between these documents, then the requirements of the Modified Plan Approval letter shall take precedence over the documentation in the application materials.

The Department has determined that the filing of an Environmental Notification Form (ENF) with the Secretary of Environmental Affairs, for air quality purposes, was not required prior to this action by the Department. Notwithstanding this determination, the Massachusetts Environmental Policy Act and Regulation 301 CMR 11.00, Section 11.04, provide certain "Fail-Safe Provisions" which allow the Secretary to require the filing of an ENF and/or an Environmental Impact Report at a later time.

This Modified Plan Approval is an action of the Department. If you are aggrieved by this action, you may request an adjudicatory hearing. A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date you received this Modified Plan Approval.

Under 310 CMR 1.01(6)(b), the request must state clearly and concisely the facts, which are the grounds for the request, and the relief sought. Additionally, the request must state why the Modified Plan Approval is not consistent with applicable laws and regulations.

The hearing request along with a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars (\$100.00) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority.

The Department may waive the adjudicatory hearing-filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

Should you have any questions concerning this matter, please do not hesitate to contact Mr. Joseph Su (978) 694-3200.

Sincerely,

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

Joseph Su
Environmental Engineer
Bureau of Air and Waste

This final document copy is being provided to you electronically by the Department of Environmental Protection. A signed copy of this document is on file at the DEP office listed on the letterhead.

Susan P. Ruch
Deputy Regional Director
Bureau of Air and Waste

cc: Fire Headquarters, 115 Southamptton Street, Boston, MA 02118
Board of Health, 1010 Massachusetts Avenue, Boston, MA 02118
DEP/BOSTON, 7th Floor, Attn: Y. Tian (E-copy)
DEP/NERO, E. Braczyk, M. Bolis, M. Persky